

strip polish recad paint
DERIV B59908

Work Order ID 48223

June 26, 2009 11:11:50 AM



Page 1

Item ID: D350-748-201

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 15/07/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 03/08/2009 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: MK

Date: 09/07/09 Tooling:

Date:

Run Start



QC:

Date: SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

N/A

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-201

CHG001

8/10/00/10

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

✓

120

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

Crosstube

DART Dart Aerospace Ltd. 1270 ABERDEEN ST HAWKESBURY ON CANADA K6A 4K4		TC APPROVAL # 09-89 TEL 1-813-632-5200	
DESC	D350-748-200	CHG	CHG001
LOT	Crosstube Air High	STC	SH06-27
MODEL	B48223	STC	SR02359NY
	AS350/355	STC	
**MADE IN CANADA		D2/29-1	

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Page 2

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Required Date: 03/08/2009 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

130



Crosstubes

Crosstubes

Crosstubes

Memo

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs, ☐ Set-up
drill table as per QSI 010 ☐ 2-Deburr ☐ 3-Engrave Part # and Batch # as per Dwg
D350-748-241 ☐ 4-Remove all marks from tube within limits of D350-748-
241 ☐ 5- Apply a light coat of LPS3 on t

140



QC

Quality Control

QC6- Inspect dimensions to drawing

Memo

150



Outsource3

Outsource process - Cad plate

Outsource process-Cadplate per QSI017 4.1.9.1

Memo

Issue P/O: 10020 ☐ Stress relief at 375° for 5 hours ☐ Magnetic
Particle Inspect per ASTM E1444 ☐ Cadmium Plate per AMS-QQ-P-416B, Class
I, Type 2 ☐ Embrittle relief at 375° for 8 hours, Chromate Treat ☐ Possible
Supplier: Southwest United Industries ☐ Ens

Cadorath

BJ 10-2-01

CL 09/07/07

P/O: 11955 CL 10/15/21 (D)

3210

Work Order ID 48223



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Item ID: D350-748-201

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Setup Start



Revision ID: D

Stop



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Start Date: 15/07/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 03/08/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: Date: Tooling: Date:

Stop



QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformity is attached								
170	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									
180	SprayPaint	0.00							
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 12-Paint Outside of Tube as per Dart QSI 005 4.2								

6/9/28
 6/4/07
 6/4/06/14
 ml 10 04 20 (1)
 (Re-work) ml 10 06 16 (1)
 ml 10 04 20 (1)
 (Re. paint) ml 10 06 15 (1)

Work Order ID 48223

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Page 4

Item ID: D350-748-201

Accept

Revision ID: D

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Start Date: 15/07/2009 Start Qty: 1.00

Required Date: 03/08/2009 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

190

QC14- Inspect Spray Paint

0.00

QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

25 10-04-21

1 Re repair 1006-16

200

Crosstubes

0.00

Crosstubes

Memo

0.00

Crosstubes

1-Install Ground wire Insert, then insert screw and washer. 12-Install Abraison strips as per Dwg D350-748-241 & QSI 035.1 13-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS

(Rework) mml 10.06.16

210

QC5- Inspect part completeness to step on W/O

0.00

QC

Memo

0.00

Quality Control

Solar/21

Re work - Solar/16

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-201 PAR #: _____ Fault Category: to tube NCR: ☒ Yes No DQA: [Signature] Date: 10/05/12
 Resolution: Accepted Disposition: use as is QA: N/C Closed: [Signature] Date: 10/06/16

NCR: <u>48223</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>10.05.11</u>	<u>140</u>	<u>NCR 10.026 - Per verification that the tubes are good per the cracking issue on above NCR</u>	<u>CP</u> <u>10.05.12</u> <u>OSI 042</u>	<u>load test per dzins email ref NCR 10.026</u> <u>strip tube & polish</u> <u>keep supports & hardware</u>	<u>[Signature]</u> <u>10.05.12</u>	<u>CP</u> <u>10.05.12</u> <u>OSI 042</u>	<u>[Signature]</u> <u>10.05.12</u>	<u>[Signature]</u> <u>10.05.12</u>
			<u>CP</u> <u>10.05.12</u> <u>OSI 042</u>	<u>to re-install</u> <u>Return to Cadornth for cad platy only - no stress relief.</u> <u>Reprime & paint</u>	<u>[Signature]</u> <u>10.05.12</u> <u>10.06.15</u> <u>10.06.16</u>	<u>S</u> <u>10.06.16</u>	<u>[Signature]</u> <u>10.05.12</u>	<u>[Signature]</u> <u>10.05.12</u>
				<u>re-assemble</u>				

NOTE: Date & initial all entries

L Lacelle

From: David Shepherd [dshepherd@dartaero.com]
Sent: April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

Work Order ID 48223

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Item ID: D350-748-201

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Item Name: Crosstube Installation, High Aft

Start Date: 15/07/2009 Start Qty: 1.00

Required Date: 03/08/2009 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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220

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-4-28 S

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

~~Subst~~
8/6/16

(H)
(H)

240

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D350-748-
201 Location: _____ : IPPP Rev: _____

POSITIVE RECALL

EFFECTIVE 10/4/19 AUTH W
RELEASED EP DATE 10.06.16

11/4/13 C

Work Order ID 48223

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Item ID: D350-748-201

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 15/07/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 03/08/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

250

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/06/10
msf
10-6-10

Picklist Print

June 26, 2009 11:11:50 AM

Page 1

Work Order ID: 48223

Parent Item: D350-748-201RevD

Parent Item Name: Crosstube Installation, High Aft

Comments:

Start Date: 15/07/2009

Required Date: 03/08/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
✓ MS21042L5 		Purchased	No			120 220	Each	0.0000	4.0000			
Nut ✓ ALS4-1032-225 		Purchased	No			200	Each	0.0000	1.0000			
Insert ✓ AN960JD10 		Purchased	No			200	Each	0.0000	1.0000			
Washer ✓ D2856-400RevA 		Manufactured	No			200	f	0.0000	1.2432			
Abraison Strip ✓ D350-748-241 TRNRevD 		Manufactured	No			200	Each	0.0000	1.0000			
Crosstube Turning Detail ✓ MS21920-20 		Purchased	No			200	Each	0.0000	2.0000			
Clamp (per MIL-DTL-8783C) ✓ MS27039-1-10 		Purchased	No			200	Each	0.0000	1.0000			
Screw ✓ AN4-6A 		Purchased	No			230 220	Each	0.0000	16.0000			
Bolt ✓ AN5-32A 		Purchased	No			230 220	Each	0.0000	4.0000			
Bolt ✓ AN4-41A 												

M113537 10.4.28 P

B# 110768 m/ 10.04.21

B# 110985 m/ 10.04.21

B# 56626 m/ 10.04.21

B# 112793 m/ 10.04.21

B# 112794 m/ 10.04.21

M112829 10.4.28 P

M113121 10.4.28 SD

50/4/28

M110731 10.4.28 P

Picklist Print

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Page 2

Work Order ID: 48223

Parent Item: D350-748-201RevD

Parent Item Name: Crosstube Installation, High Aft






Comments:

Start Date: 15/07/2009

Required Date: 03/08/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
✓ AN960JD416 	ANS1149004631	Purchased	No			230	Each	0.0000	32.0000			
Washer ✓ AN960JD516 	ANS1149005631	Purchased	No			230	Each	0.0000	8.0000			
Washer ✓ D3501-1RevA 		Manufactured	No			230	Each	0.0000	16.0000			
Bushing ✓ D3502-1RevB 		Manufactured	No			230	Each	0.0000	2.0000			
Support ✓ MS21042L4 		Purchased	No			230	Each	0.0000	24.0000			
Nut SADDLE												

M113706

10-4-28

M113706

10-4-28

B45402

10-4-28

B# 52903

M 10.04.21

M114108

10-4-28

✓ D3500-1
10/11/09
SADDLES
Qty 4
B# ~~52326~~
52326
47119
10-4-28
(3x)

June 26, 2009 11:11:50 AM

Shop Packet Print

Page 2

Date:
User:Wednesday, 27/05/2009 12:54:42 PM
Julie Dawson

Process Sheet

Customer	: CU-DAR0011 Dart Helicopters Services	Drawing Name	: 350/355 AS X-TUBE AFT
Job Number	: 48223		
Estimate Number	: 12486		
P.O. Number	:	Part Number	: D350748201
This Issue	: 27/05/2009	S.O. No.	:
Prsht Rev.	: NC	Drawing Number	: N/A
First Issue	: 11	Project Number	: N/A
Previous Run	: 48222	Drawing Revision	: D
Written By	:	Material	:
Checked & Approved By	: <u>JUD09.05.27</u>	Due Date	: 17/06/2009
Comment	Est Rev: A New Issue 06-07-05 JLM Est Rev: B Update qty of MS21042L5 06-09-12 KJ Est Rev C Combined manufacturing 08.04.02 EC verified by: DD Est Rev: D 08-06-24 revD as per dwg DD verified by: EC Est Rev: E 08.12.11 Step17 was step 21 KJ Verified by:		

Qty: 1 Um: Each

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description:

1.0 ✓ DC

DOCUMENT CONTROL



Comment: Photocopy bluefile & type labels per PPPD350-748-201 CHG001

2.0 ✓ D350748241TRN

Crosstube Turning Detail



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch: B-47782 D350748241

MB 09-06-15 0

3.0 ✓ BENDING

BENDING MACHINE - SKIDTUBES



Comment: BENDING MACHINE

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

MB 09-06-15 0

4.0 ✓ QC15

DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

09-06-15 0



5.0 ✓ CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

MB 09-06-15

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-201 PAR #: _____ Fault Category: K-Lines NCR: (Yes) No DQA: _____ Date: 10/05/12
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: 7/8 Date: 10/06/16

NCR: <u>48223</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>09-06-15</u>	<u>3.0</u>	<u>Upon bending the material wrinkled on the inside of the rad. B47172 scrap.</u> <u>R.C: process / occasionally happens</u>	<u>[Signature]</u> <u>09/06/16</u> <u>QST/42</u>	<u>Tube is scrap / destroyed.</u> <u>Use for new test rig in Eng.</u> <u>Replace on this W/O</u> <u>B 47169</u>	<u>MB</u> <u>09-06-16</u> <u>①</u>	<u>[Signature]</u> <u>9-6-16</u>	<u>[Signature]</u> <u>09/06/16</u> <u>QST/42</u>	<u>[Signature]</u> <u>09/06/15</u>

NOTE: Date & initial all entries

Date: Wednesday, 27/05/2009 12:54:42 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 48223

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Engrave Part # and Batch # as per Dwg D350-748-241

MB 09-06-15 ①
- ARM 9-6-17 ①

5- Apply a light coat of LPS3 on the interior of tube

Batch:

M109956 ARM 9-6-17

6.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

S01/06/17 ④

7.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: _____

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

10.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

2-Paint Outside of Tube as per Dart QSI 005 4.2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 27/05/2009 12:54:43 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 48223

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

11.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

12.0

D2856400

Abraison Strip



Comment: Qty.: 1.2401 f(s)/Unit Total : 1.2401 f(s)

Abrasion Strip 7.10" long x2

Batch: _____

13.0

ALS41032225

Insert



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Insert

Batch: _____

14.0

AN960JD10

Washer



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Washer

Batch: _____

15.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Clamp (per MIL-DTL-8783C)

Batch: _____

16.0

MS27039110

Screw



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Screw

Batch: _____

17.0

D35021

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

SUPPORT

Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 27/05/2009 12:54:43 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 48223

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abraison strips as per Dwg D350-748-241 & QSI 035.

3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

21.0

D35001

Saddle



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
350 SADDLE

Batch: _____

22.0

D35011

Bushing



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)
BUSHING

Batch: _____

23.0

AN46A

Bolt



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)
Bolt

Batch: _____

24.0

AN441A

bolt



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)
bolt

Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 27/05/2009 12:54:43 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 48223

Part Number: D350748201

Job Number:



Seq. #: Machine Or Operation: Description :

25.0



AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt

Batch: _____

26.0



AN960JD416

Washer



Comment: Qty.: 32.0000 Each(s)/Unit Total : 32.0000 Each(s)
Washer

Batch: _____

27.0



AN960JD516

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)
Washer

Batch: _____

28.0



MS21042L4

Nut



Comment: Qty.: 24.0000 Each(s)/Unit Total : 24.0000 Each(s)
Nut

Batch: _____

29.0



MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Nut

Batch: _____

30.0



QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

31.0



PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D350-748-201

Location: _____

PPP Rev: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 27/05/2009 12:54:43 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 350/355 AS X-TUBE AFT

Job Number: 48223

Part Number: D350748201

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0 ✓

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion ✓



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

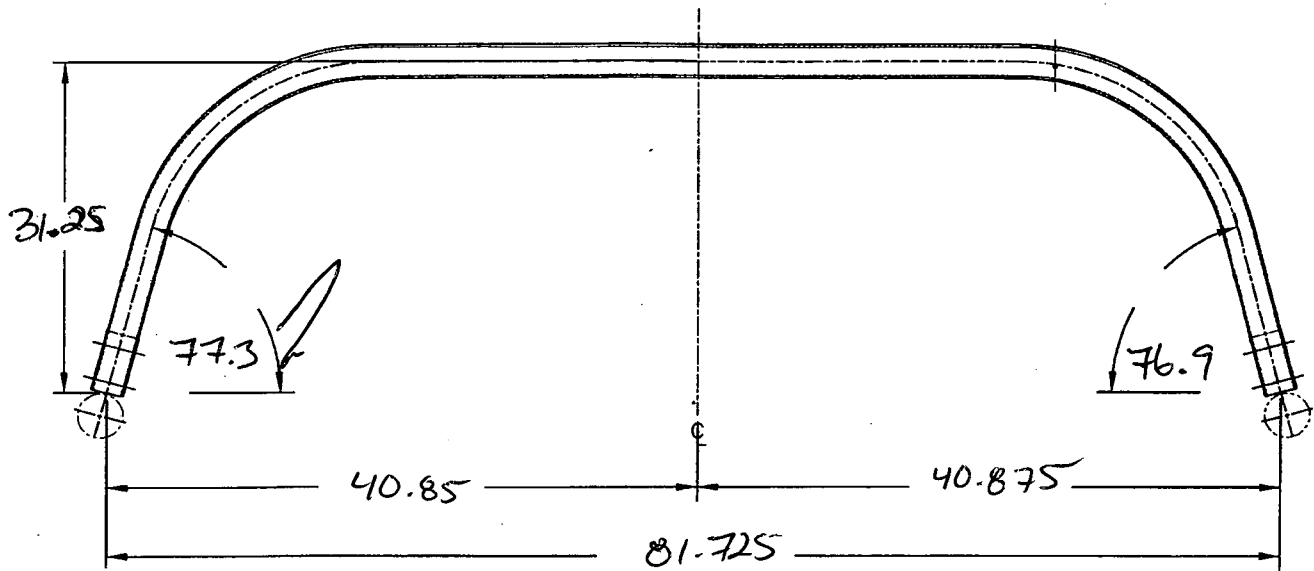
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	48223
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
Tube sits perfectly flat on the 4 blocks set up on the drill table.

QC15 Inspection	<i>[Signature]</i>
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM <i>[Signature]</i>	<i>[Signature]</i>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>///</i>	APPROVED <i>///</i>	DRAWING NO. D350-748-241	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI AFT) SCALE NTS	
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6018-125 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

RELEASED

06.10.31 *///*

QTY	P/N	DESCRIPTION
X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
1	D6018-125	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6018-125 OR D6015-125
FINISHED LENGTH = 122.70±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

UNDER REVIEW

09.02.05
PER PCR 09-001

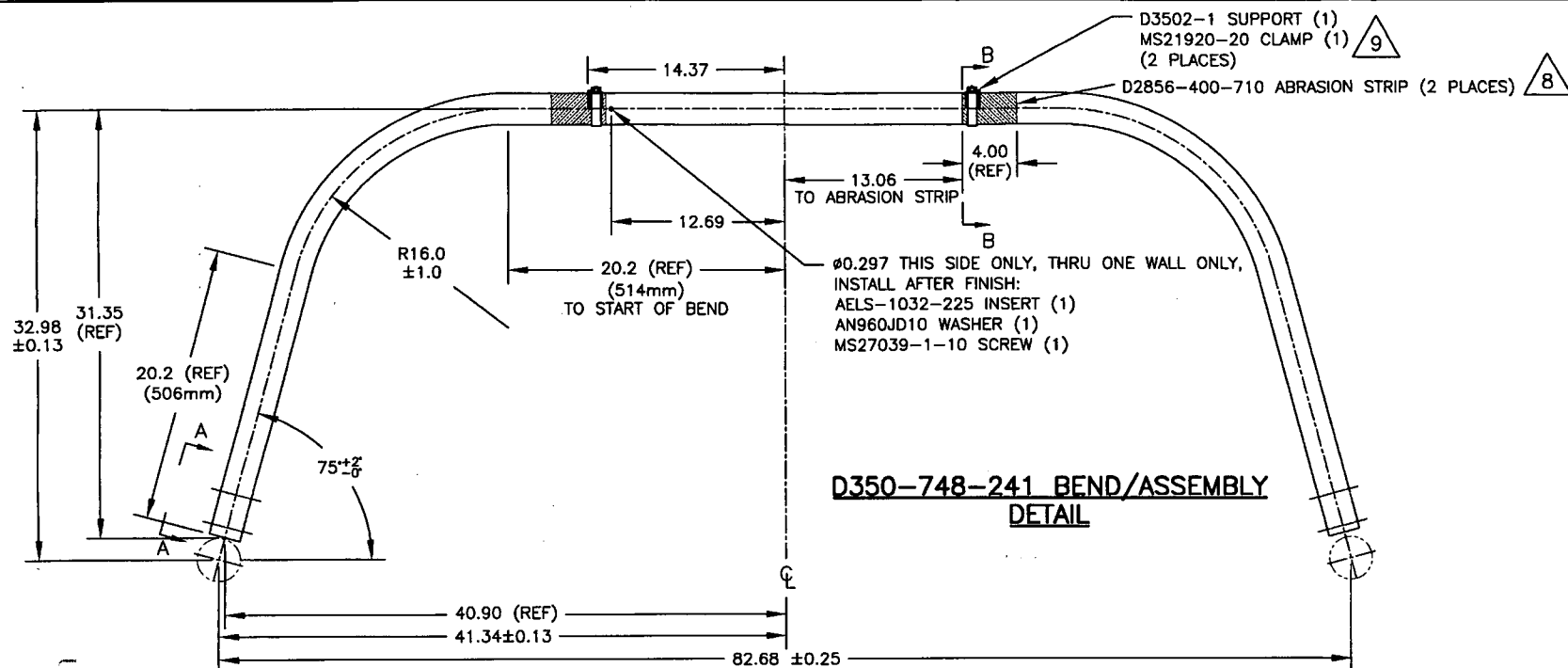
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RETURN TO
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AS TO AMENDMENT
WITHOUT NOTICE
DRILLING ORDER
TO 11823

UNDER REVIEW

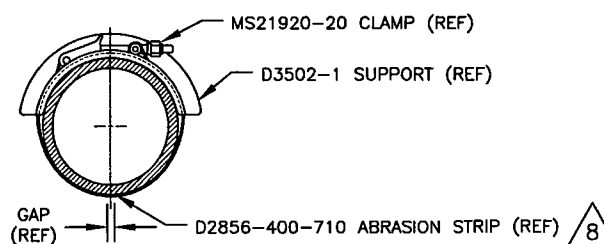
07.07.16
CUT FOR REVIEW
07.07.22

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SECTION B-B
SCALE 1:2

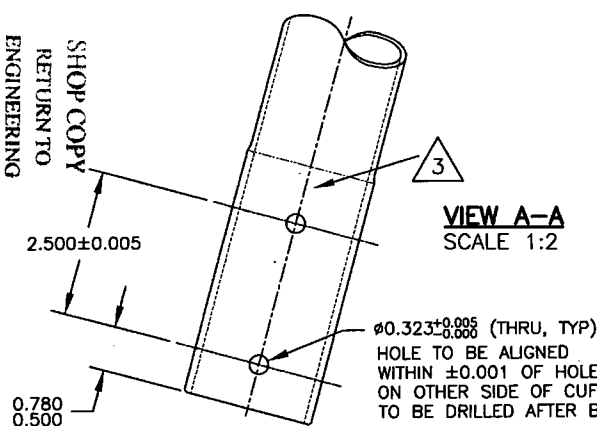


UNDER REVIEW
09.02.05

UNDER REVIEW
07.02.16
OK 07.10.22

RELEASED

06.10.31

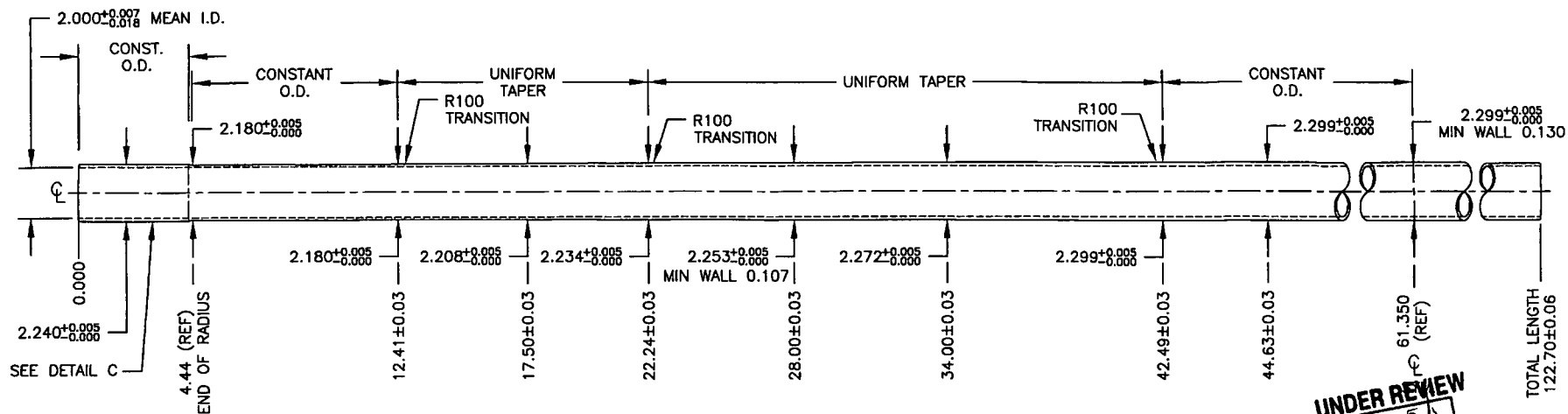


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DESIGN	q	DRAWN BY	q	DART	DART AEROSPACE LTD. MARKHAM, ONTARIO, CANADA
CHECKED	#	APPROVED	#	DRAWING NO. D350-748-241	REV. D SHEET 2 OF 3
DATE	06.10.31	TITLE	CROSSTUBE (AS 350/355 HI AFT)	SCALE	1:8

WORK ORDER
NO. 10202
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE

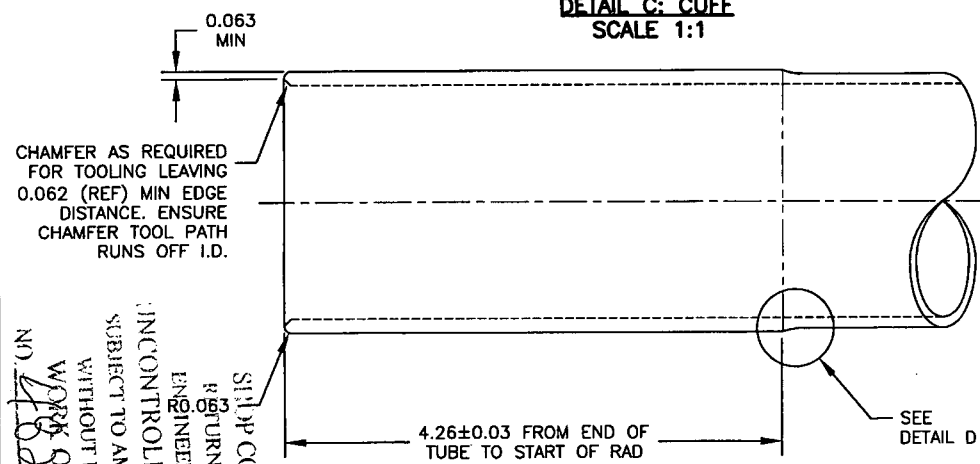


D350-748-241 MACHINING DETAIL

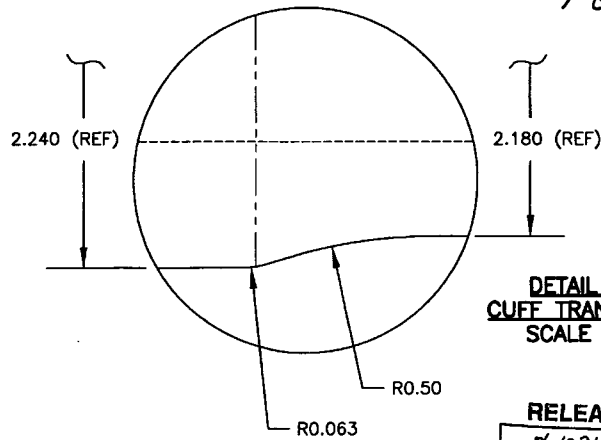
UNDER REVIEW
09.02.03

UNDER REVIEW
09.02.03

DETAIL C: CUFF SCALE 1:1



UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER NO. 40003



DETAIL D: CUFF TRANSITION SCALE 9:1

RELEASED
06.10.31

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DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI AFT)		SCALE 1:4			

Packing Slip



Cadorath Plating Co. Ltd.

2150 Logan Avenue, Winnipeg, Manitoba R2R-0J2

Phone: (204) 633-9420 Fax: (204) 633-8033

INVOICE NUMBER:

45402

Sold To:

Dart Aerospace Ltd.
1270 Aberdeen St.

Hawksbury, ON K6A 1K7

ShipTo:

Net 2% Interest Per Month charged on Overdue Accounts.

Any claims for shortages, overcharges, or damaged goods must be made within seven (7) days from receipt of goods.

Customer Order #:	Date Received:	Terms:	G.S.T. #:	Ship Via:	Ship Date:
10020	Jul-14-2009	NET 30 DAYS	10071 6547 RT0001		Jul-24-2009

Item # Qty P/N & Description

1	1 EA	SKID	S/N B48222
		P/N D350-748-201	W/O 88057
2	1 EA	SKID	S/N B48221
		P/N D350-748-201	W/O 88058
3	1 EA	SKID	S/N B48220
		P/N D350-748-201	W/O 88059
4	1 EA	SKID	S/N B48223
		P/N D350-748-201	W/O 88060

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jul-24-2009

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 88060

INVOICE #: 45402

**CONTRACT OR
PURCHASE ORDER # 10020**

DESCRIPTION: SKID

QTY 1


P/N # D350-748-201

S/N # B48223

**STRESS RELIEFE. MPI IAW ASTM-E-1444. CADMIUM PLATE IAW
AMS-QQ-P-416B TYPE 2 YELLOW CLASS 2. BAKE HEAT CHARTS #
10651 AND 10700.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:


A circular stamp is located to the right of the signature, containing the text "CA" over "06".

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Feb-22-2010

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 93265
INVOICE #: 48326

**CONTRACT OR
PURCHASE ORDER #** 513885

DESCRIPTION: SKID

QTY 1

P/N # D350-748-201

S/N # B48223

STRESS RELIEF BAKED @ 375 DEG. FOR 5 HRS. BAKE HEAT
CHART #10-116. MPI INSPECTED IAW ASTM-E-1444. CADMIUM
PLATED IAW AMS-QQ-P-416B, TYPE 2 YELLOW, CLASS 1. BAKE
HEAT CHART #10-169.

CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.

Approved Inspector:



A large, stylized handwritten signature in black ink, written over a horizontal line.

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-10-2010

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 95777

INVOICE #: 49903

**CONTRACT OR
PURCHASE ORDER #** PO11955

DESCRIPTION: SKID

QTY 1

P/N # D350-748-201

S/N #

**CADMIUM PLATE STRIPPED IAW MIL-STD-871. CADMIUM PLATED
IAW AMS-QQ-P-416B, TYPE 2 YELLOW, CLASS 2.**

CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.

Approved Inspector:



A large, stylized handwritten signature in black ink.